REMARKS

Very thanks for Examination's suggestion and thanks for finding some citations about the present invention, thereby, the applicant may know more information about the invention. This case has been carefully reviewed and analyzed in view of the office action.

Responsive to the objections and rejections made of the Examiner in office action. We have amended the specification, claims and abstracts. All the errors disclosed in that office action has been corrected according to the Examiner's indications disclosed in the official action.

Examiner has kindly provides reference prior arts about the present invention, and thus the applicant has more information about the invention. All details of the reference prior arts are fully considered and compared with the present invention.

Indeed the citations disclose some features of the present invention, and the applicant agrees with these viewpoints, however applicant discovers that some features of the present invention are not wholly disclosed by the citations, which are claimed in the original specifications and especially drawings. Thereby, the applicant desires to get the patent rights of these features.

When comparing with the prior art and citation, the applicant decides to cancel Claims 1 and 2, without prejudice or disclaimer of the subject matter thereof, and add new claims 3 and 4. The added new claim 3 is based on the original claim 1 and the original specification. And the new 4 is the same as the original claim 2, but now it is dependent to the new claim 3. Thereby, it is assured that the new claim are based on the original claim and specification and thus no new matter is added. The claims 3 and 4 is listed below, which shows the relation of the claims 3 and 4 to the original claim and specification.

LIST OF CLAIM WITH RESPECT TO THE ORIGINAL CLAIM

2. (New claim, showing the relation of h) A method for manufacturing a zipper without shift in injection molding; comprising the steps of:

forming a bank of continuous zipper teeth 2 on an inner side of each of two parallel zipper strips 11 ~~a zipper strip~~ by molding injection; wherein an inner side of each zipper strip11 has a respective connecting strip 111;

scraping a part of zipper teeth 2 on each ~~the~~ zipper strip 11;

melting two layers of films 13 ~~and coating the films 13~~ so that each films 13 enclosing two ~~on the upper and lower~~ sides of each ~~the~~ zipper strip 11 at the part without zipper teeth 12 by thermal pressing technology;

punching a hole ~~holes~~ 14 at an inner lateral side ~~sides~~ of each film ~~the films~~ and the hole 14 passing through each zipper strip, but the connecting strip 13 at an inner side of the zipper strip is remained;

guiding the two zipper strips 11 into an upper and a lower engaging piece molds; and tensioning ~~expanding~~ the zipper strips within the mold so as to place the zipper strips ~~engaging pieces~~ on the molds flatly;

injection-molding upper engaging pieces 17, 18 at inner sides of the zipper strips 11 and injection-molding lower engaging pieces at inner sides of the films; removing ~~moving~~ the molds from the

zipper strips and removing other undesired objects; and

cutting the zipper strips through ~~along~~ the holes, thus forming the ~~upper and lower~~ engaging pieces 17, 18 of a zipper;

wherein in the step of forming the hole 14, the ~~a~~ connecting strip 13 at an edge having the films must be retained for fixing the zipper teeth; when the zipper strips are tensioned within the molds ~~expanded~~, the zipper strips will resist against a ~~the~~ pulling force applied thereon; thereby, the zipper strips are precisely positioned in the upper engaging piece mold and the lower engaging piece mold.

In the following we will discuss the novelty and inventive step of the present invention.

(A) Features of the present invention,

Please referring to the attachment drawing (an attachment for describing the novelty of the present invention, instead of the amendment of drawings). In the attachment drawing, marks are used to indicate the different of the present invention, wherein the

"punching a hole 14 at an inner lateral side of each film and the hole passing through each zipper strip, **but the connecting strip at an inner side of the zipper strip is remained**;" so that "when the zipper strips are tensioned within the molds, the zipper strips will resist against a pulling force applied thereon; thereby, the zipper strips are precisely positioned in the upper engaging piece mold and the lower engaging piece mold."

The new claim 2 adds the feature that shown above by bold face, however, Figs. 9 and 10 of the present invention show this features.

However, referring to the attachment drawing, it is shown that in the manufacturing process of the present invention, the connecting strip 13 is never cut off, while in the citation USP 5,536,343, the connecting strips 34 are cut off in the manufacturing process. In Fig. 2 of the prior art, it is also illustrated that the connecting strips 93 are cut off in the manufacturing process. Thereby, this is the different of the present invention from the citations. As above said, not to cut off the connecting strip is for precisely positioned the zipper strips in the upper and lower molds.

From Fig. 1 to 4 of the prior art cited in the specification of the present invention, it is illustrated that the connecting strips 901 are cut off. From Fig. 10 of the citation USP 5,536,343, it also shows that the connecting strips 34 are cut off.

Please referring to Fig. 12 of the present invention, it is illustrated that the connecting strip is extended to the end portions of the engaging pieces 15 and 16 so that in the manufacturing process, the zipper strips can be precisely and steadily positioned in the upper and lower mold. However, the citations can not achieve this object.

Thereby, from above two points, it is illustrated that the two citations have no main features of the present invention, and thus the two citations are not suitable to reject and object the present invention.

Therefore it is apparent that in this point, the present invention is different from the citation. Thus the present invention is an invention of inventive step and novelty.

Applicant requests and authorizes Examiner to amend the claims of the

present invention so that the claim can match the requirement of U. S. Patent. Attentions of Examiner to this matter is greatly appreciated.

Since in above discussion, it is apparent that no prior art has the features of the present invention, especially in new claim 2. Furthermore, as we know that no other prior art has features of the present invention. Thus, the present invention is novel and inventive.

It is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectively requested.

Respectfully submitted.

Chang - Wen Cao

Dated: 02 / 09 /2004

235 Chung – Ho Box **8-24**

Taipei Taiwan R. O. C.

"MARK-UP" COPY OF THE AMENDED SPECIFICATION

METHOD FOR MANUFACTURING ZIPPER WITHOUT SHIFT IN INJECTION MOLDING

Field of the invention

The present invention relates to zippers, and particularly to a method for manufacturing a zipper without shift in injection molding.

Background of the invention

The engaging pieces of prior art zippers, especially lower engaging pieces, possibly shift in the manufacturing process since the zipper strips cannot be precisely located ~~can not precisely locate~~ on the upper and lower engaging piece molds so that the upper and lower engaging pieces cannot be precisely positioned in the molds ~~can not be positioned in the molds precisely~~. Therefore, the upper and lower engaging pieces have bad appearance ~~appearance~~.

With reference to Figs. 1 and 2, the prior art way for manufacturing a zipper is illustrated. The prior art zipper has a left and a right zipper strips 90. Each zipper strip 90 has zipper teeth 91 thereon. A part of the zipper teeth 91 is scraped with a predetermined length. Then two layers of films are melt and then coated on the two sides of the zipper strips 90. Then the two layers of films are punched with notches 93 which are opened. In the punching process, the connecting strip 901 is also punched. Then, lower engaging pieces 94, 95 are injection-molded on the notches, and the upper engaging pieces 96, 97 at the upper side of

the films 92 are injected.

In above process, the two layers of films are used to fix the lower engaging pieces of the zipper 9. Other than combining the lower engaging pieces 94, 95 to the films 92, the fingers may pinch this part. The object of forming the notches 93 is that ~~when~~ the lower engaging pieces 94, 95 will extend to the notches 93 after they are injection-molded (referring to Fig. 2) so that the bottoms of the lower engaging pieces will not enclose the zipper strips and the films 92. Therefore, the strength of the bottom is larger than other part.

Referring to Fig. 3, the shaping of the lower engaging pieces 94, 95 and the upper engaging pieces 96, 97 must guide the zipper strips into the molds. When the zipper strips are guided into molds so that the zipper strips are precisely positioned in the upper and lower molds. The zipper strips 90 must be tensioned within the mold ~~expanded~~ so as to become straight and thus flat on the molds. However, the films 92 will deform as the zipper strips 90 are tensioned within the mold ~~expanded~~ due to the action of the notches 93 with openings on the films 92 of the zipper strips 90. These notches will cause the widths of the films become smaller. Therefore, ~~when~~ the zipper strips are tensioned within the mold ~~expanded~~ and thus the notches 93 will deform. In general the rectangular notches will become trapezoidal notches (referring to Fig. 3) or the films 92 are ~~is~~ bent and deformed. Therefore, the engaging pieces can not precisely match the upper and lower molds. After the lower engaging pieces 94, 95 and upper engaging pieces 96, 97 are injection-molded, the zipper strips 9 can be separated from the molds. Then the upper and lower engaging pieces of the released zipper strips 9 (referring to Fig. 4), especially the lower engaging pieces, will shift and dislocate due to the deformation of the films in the injection-molding process. As a result, it is very possible that the upper and lower engaging pieces can not be matched with one another or even a bad outlook appears ~~occurs~~.

Summary of the invention

Accordingly, the primary object of the present invention is to provide a method for manufacturing a zipper without shift in injection molding, wherein the method comprises the steps of forming a bank of continuous zipper teeth at an edge a zipper strip; wherein an inner side of each zipper strip is attached with a connecting strip; scraping a part of zipper teeth on the zipper strip; melting two layers of films and coating the films on the upper and lower sides of the zipper strip; punching a hole at inner lateral sides of the films of each zipper strip and the connecting strips are remained; guiding two zipper strips into an upper and a lower engaging piece molds; and tensioning ~~expanding~~ the zipper strips within the molds; injection-molding upper engaging pieces and injection-molding lower engaging pieces; moving the molds from the zipper strips and removing other undesired objects; cutting the zipper strips along the holes, thus forming the upper and lower engaging pieces of a zipper. When forming the hole, a connecting strip at an edge having the films must be retained. Thereby, the zipper strips can be precisely positioned in the upper engaging piece mold and the lower engaging piece mold.

The various objects and advantages of the present invention will be more readily understood from the following detailed description when read in conjunction with the appended drawing.

Brief Description of the Drawings

Fig. 1 is a schematic view showing the coating films process in the prior art zipper.

Fig. 2 is a schematic view showing the step of injection-molding the upper and lower engaging pieces in the prior art design.

Fig. 3 is a schematic view showing the deformation of the zipper strips in the prior art.

Fig. 4 is a schematic view showing the shift of the prior art zipper after injection molding.

Fig. 5 shows the manufacturing process of the present invention.

Fig. 6 is a schematic view showing the zipper teeth being formed on the zipper strip of the present invention.

Fig. 7 is a schematic view showing the step of scraping the zipper teeth in the present invention.

Fig. 8 is a schematic view showing the step of coating films in the present invention.

Fig. 9 is a schematic view showing the step of forming a hole on the film of the present invention.

Fig. 10 is a schematic view showing the process of forming the upper and lower engaging pieces in the molds of the present invention.

Fig. 11 is a cross sectional view of a finished zipper in the present invention.

Fig. 12 is a schematic view showing the lower engaging pieces of the present invention.

Detailed Description of the Preferred Embodiments

The manufacturing process of the present invention has been illustrated in Fig. 5. The present invention comprises the step of forming a bank of continuous zipper teeth on an inner side of one of a pair of parallel zipper strips ~~a zipper strip~~ by molding injection; wherein an inner

side of each zipper strips has a respect connecting strip (step 1); scraping a part of zipper teeth on the zipper strip (step 2); by thermal pressing, melting two layers of films and then coating the films on the upper and lower sides of the zipper strip at the part without zipper teeth (step 3); punching holes at inner lateral sides of the films while the connecting strips are left; but the connecting strip is remained (step 4); guiding two zipper strips into an upper and a lower engaging piece mold; tensioning ~~expanding~~ the zipper strip within the molds so as to be placed on the mold flatly and the zipper strips being matched to the upper and lower engaging piece molds (step 5); injection-molding upper engaging pieces at inner sides of the zipper strips and injection-molding lower engaging pieces at inner sides of the films (step 6); moving the molds from the zipper strips and removing other undesired objects (step 7); cutting the zipper strips along the holes, thus forming the upper and lower engaging pieces of a zipper (step 8).

The process of forming the present invention is illustrated in Figs. 6 to 11. Fig. 6 shows the condition of forming zipper teeth (step 1). Two zipper strips 11 are disposed in parallel. The inner side of each zipper strip 11 has a connecting strip 111. A bank of zipper teeth 12 with teeth being spaced with an equal space are injected to the inner side of each zipper strip 11. The zipper teeth 12 ~~2~~ clamp the zipper strip 11 steadily by the connecting strip 111. Thereby, the zipper teeth 2 are flexible and can prevent from dropping down due to an outer force applied thereon.

Fig. 7 shows a condition that the zipper teeth 12 ~~2~~ have been scraped (step 2). A part of the zipper teeth 12 ~~2~~ with a length of 3 cm is scraped, wherein the length of that part is changeable ~~determined~~ as required. Now, the zipper strip 11 still remains on the connecting strip 111.

Fig. 8 shows the process of coating films (step 3). At the part of the zipper strip 11 without zipper teeth 2 near the upper zipper teeth 12 ~~2~~, two layers of films 13 are melt and then are fixed to the upper and lower sides

of the zipper strip 11 by thermal pressing (for example, supersonic welding). Thereby, the part of the zipper strip 11 having the films is flexible. It has the function of wet and friction-preventing and protecting zipper strip.

Fig. 9 shows the process of forming holes on the zipper strips (step 4). A hole 14 is formed on the film 13 by punching, while the connecting strip 111 is remained. When two zipper strips 11 are guided into the engaging piece molds (step 5), the inner side of each hole has a completely connecting strip 111, and thereby, as the zipper strip 11 is tensioned within the molds ~~expanded~~ from upper and lower sides. The hole 14 of ~~the~~ each zipper strips ~~films~~ 11 will not deform due to the flexibility of the connecting strip 111. Furthermore, the film does not become uneven. Therefore, the zipper strip 11 can be precisely located to the upper and lower engaging piece molds.

Referring to Fig. 10, the process of forming the upper and lower engaging pieces (step 6) is illustrated. After injection molding, the upper engaging pieces 17, 18 and lower engaging pieces 15, 16 are precisely located on the zipper strips 11 without shifting or dislocation. Furthermore, the connecting strip 111 passes through the upper and lower engaging pieces.

Fig. 11 shows a process of cutting zipper strips (step 8). A cutting machine moves along the uppermost side of the hole 14 and then cuts the connecting strip 111 at the lower end of the lower engaging pieces 15, 16.

Fig. 12 shows ~~show~~ that the difference of the lower engaging pieces 15 ~~16~~ and 16 from the convention ones is that the lower end thereof has cutting traces (as illustrated by an arrow). The conventional lower engaging piece has no cutting surface on the connecting strip 111. However, the lower engaging pieces of the present invention have not been enclosed by films. Therefore, it is stronger in structure. It is

unnecessary to worry about the problem of insufficient stress due to the connecting strip 111. Since in some cases the conventional lower engaging pieces shifts ~~shifts~~ due to the manufacturing process and technology. By the present invention, not only the upper and lower engaging pieces are not effected, but also no shift occurs in the manufacturing process.

The present invention are thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the present invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

ABSTRACT

A method for manufacturing a zipper without shift in injection molding comprises the steps of forming a bank of continuous zipper teeth at an edge ~~a zipper strip~~ of each of two parallel zipper strips ~~a zipper strip~~ by molding injection; wherein an inner side of each zipper strip has a respective connecting strip; scraping a part of zipper teeth on the zipper strip; melting two layers of films and coating the films on the upper and lower sides of the zipper strip; punching holes at ~~an~~ inner lateral sides of the films, but the connecting strips are remained; guiding two zipper strips into an upper and a lower engaging piece molds; and tensioning ~~expanding~~ the zipper strips within the molds; injection-molding engaging pieces; moving the molds from the zipper strips; cutting the zipper strips along the holes, thus forming the upper and lower engaging pieces of a zipper. ~~When forming the hole, a connecting strip at an edge having the films must be retained. Thereby, the zipper strips can be precisely positioned in the upper engaging piece mold and the lower engaging piece mold.~~

Annotated Marked-up Drawings

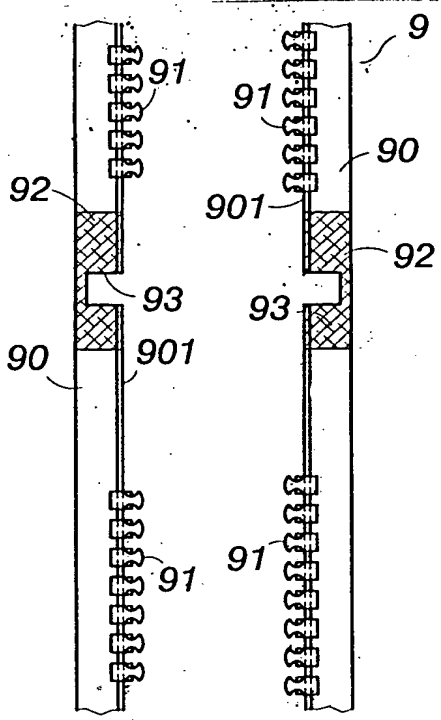

Fig.1

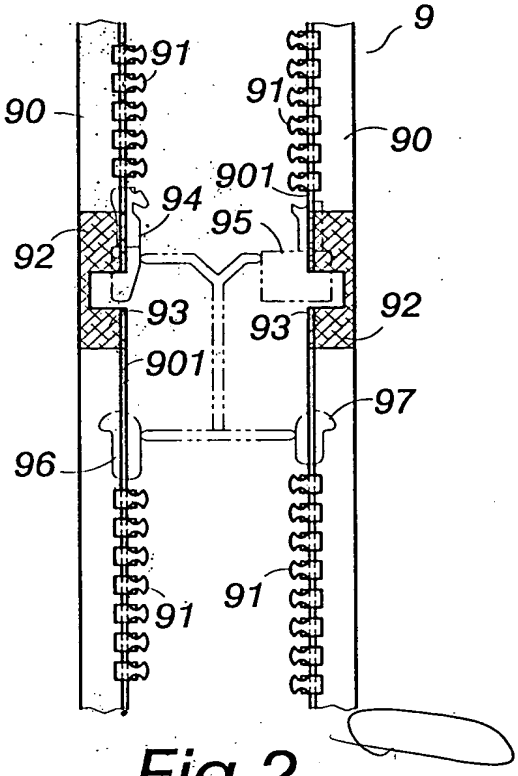

Fig.2

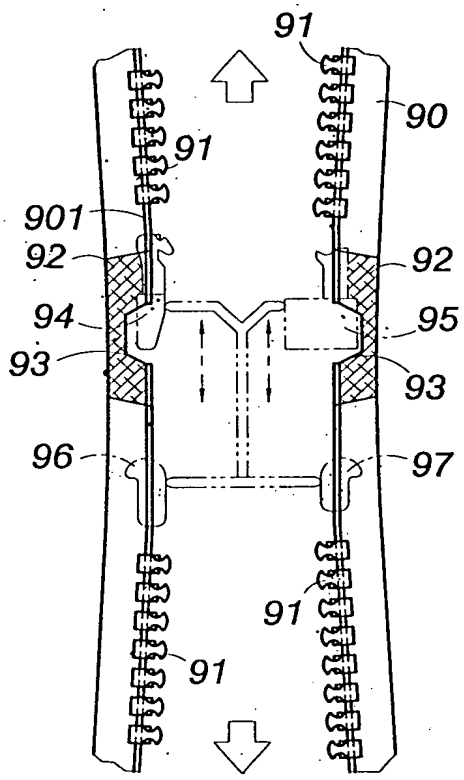

Fig.3

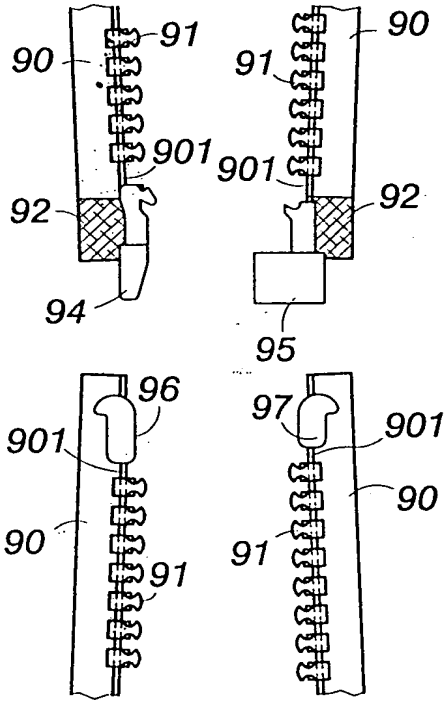

Fig.4

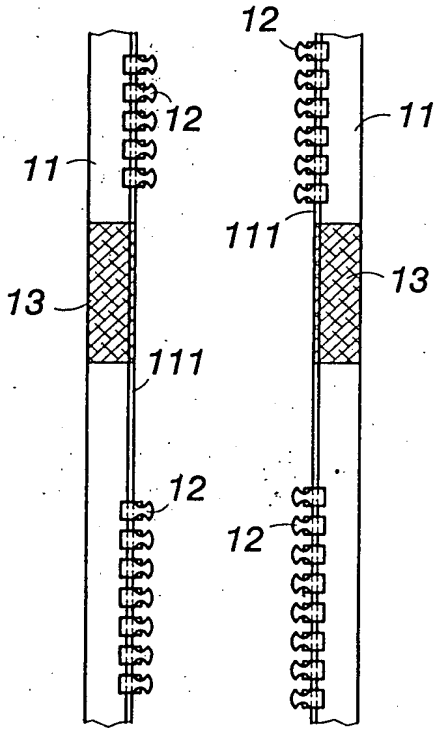

Fig.8

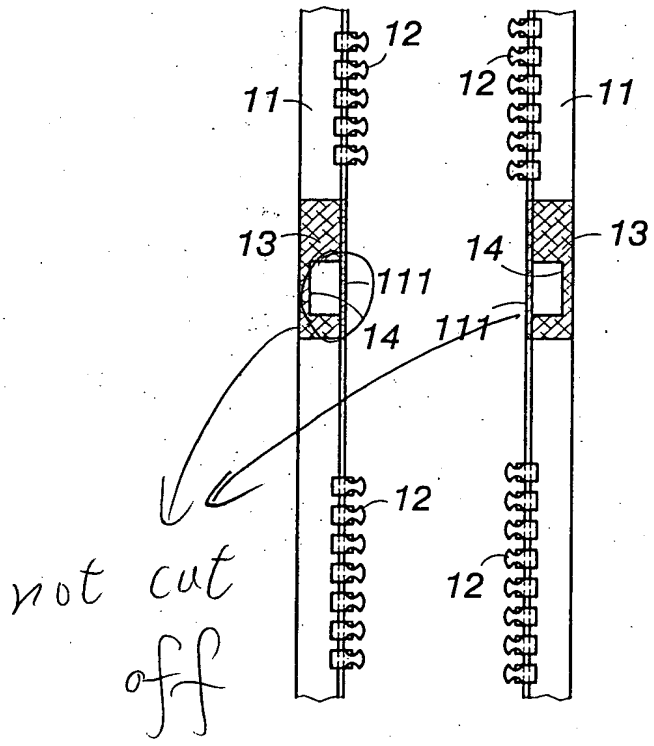

Fig.9

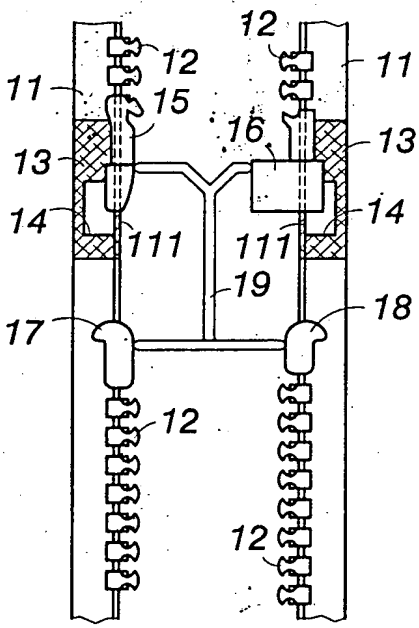

Fig.10

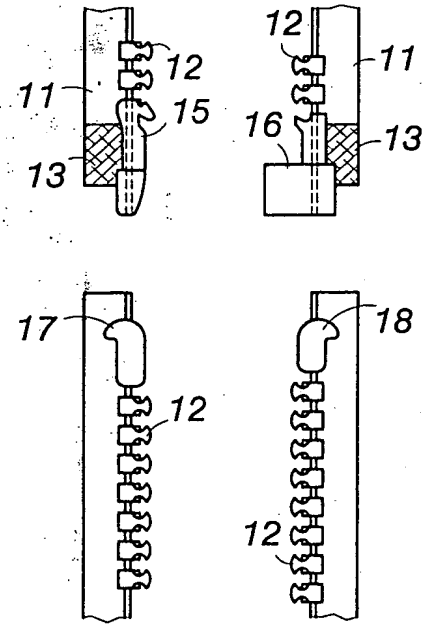

Fig.11

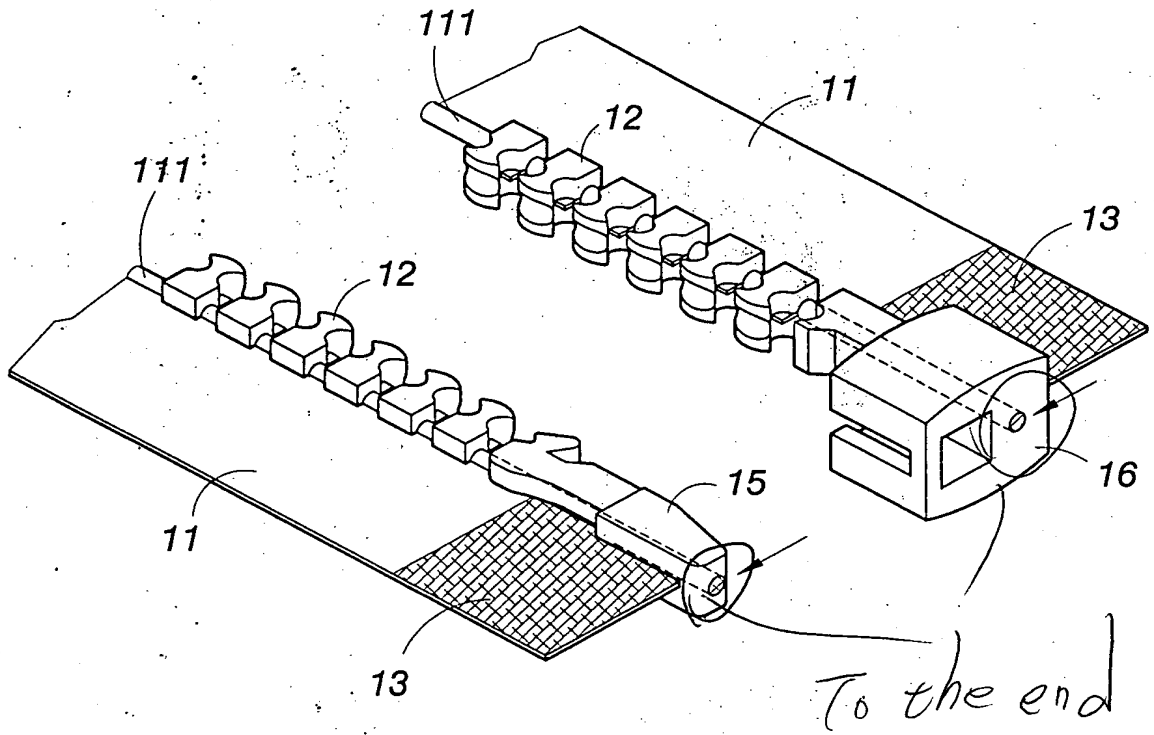

Fig.12